to the cooling means occur by pulse width modulating the current or voltage supplied to the at least one light source or the cooling means respectively.

[0043] Preferably, the pulse width modulation frequency employed in the step of regulating the power supplied to the at least one light source is greater than the pulse width modulation frequency employed in the step of adjusting the power supplied to the at least one light source.

[0044] Preferably, the pulse width modulation frequency employed in the step of regulating the power supplied to the at least one light source is sufficiently high that the current supplied to the at least one light source, after being filtered by the Inverter, is at a substantially constant analogue or DC level.

BRIEF DESCRIPTION OF DRAWINGS

[0045] Further aspects of the present invention will become apparent from the following description which is given by way of example only and with reference to the accompanying drawings in which:

[0046] **FIG. 1***a* is a perspective view of the backlighting system for a display apparatus in accordance with a preferred embodiment of the present invention;

[0047] **FIG. 1***b* is a perspective view of a prior-art backlighting system for a display apparatus,

[0048] **FIG. 2***a* is a basic schematic block diagram of a circuit layout of the electronic components associated with a single controller and inverter used in the backlighting system shown in **FIG. 1***a;*

[0049] **FIG. 2***b* is a basic schematic block diagram of a circuit layout of the electronic components associated with a single controller and associated inverter used in a prior-art backlighting system;

[0050] **FIG. 3** is a basic schematic block diagram of a circuit layout of the electronic components, including all of the inverters and controllers used in the backlighting system of **FIG. 1***a;*

[0051] **FIG. 4***a* is a flow diagram showing the main steps and decisions involved in the operation of the power distribution/control system for the backlighting system of **FIG. 1**;

[0052] **FIG. 4***b* is a flow diagram showing the steps and decisions involved in the "Update fan LF PWM Control" step of the flow diagram of **FIG. 4***a;*

[0053] **FIG. 4***c* is a flow diagram showing the steps and decisions involved in the "Update backlight HF PWM Control" step of the flow diagram of FIG. 4*a;*

[0054] **FIG. 5***a* is a basic schematic block diagram of a portion of the circuit layout shown in **FIG. 2***a* illustrating the types of electrical signals existing at various parts of the circuit; and

[0055] **FIG. 5***b* is a series of waveform diagrams for some of the electrical signals in **FIG. 5***a*.

BEST MODES FOR CARRYING OUT THE INVENTION

[0056] With reference initially to **FIGS. 1***b* and **2***b,* examples of a backlighting system and basic circuit block diagram according to the prior-art for controlling the power distribution to a series of light sources such as fluorescent lamps, and in particular Cold Cathode Fluorescent Tubes (CCFT) or lamps, are shown. The prior-art backlighting system includes a regulator **1** which receives DC input power and controls the amount of this input power fed to a royer **2**. The royer **2** converts the DC voltage output by regulator **1** to an AC voltage which is boosted by a transformer **3**. Commonly, the combination of royer and transformer is known as an inverter.

[0057] A ballast capacitor **4** is positioned between the secondary side of the transformer and one end of the or each lamp **5** and is required In order to establish a starting voltage and make the lamp appear as a linear electrical load to the regulator/royer combination. Regulator **1** enables the backlighting system to regulate or control the brightness of the lamp and receives feedback of the current through the lamp from a current sense resistor **6**. Regulator **1** typically has a very simple control algorithm such as inverse proportional control wherein the reciprocal of the feedback signal is subtracted from the regulator input. An external microcontroller **7** receives user input (such as brightness and contrast changes) from controls **8** and provides control signals to the regulator **1** in order to adjust the current supplied to the lamp **5**.

[0058] It can be seen that the majority of the electronic components are mounted on a circuit board substrate or printed circuit board (PCB) **9** although inverters **2,3** are shown mount d separately from the PCB **9**. The lamps **5** are all mount d with their longitudinal axes parallel to one another and in the same plane. A first lamp-end circuit board **10** which may include the ballast capacitors **4** connects together the proximal ends of various of the lamps and a second lamp-end circuit board **11** connects together all of the distal ends of the lamps to ground wire **19**. In **FIG. 1***b,* half of the lamps receive power from a first inverter **2,3** while the other half of the lamps receive power from a second inverter **2,3**. However, further inverters could be used to individually supply a larger number of groups of lamps and this would result in a larger number of wires running between inverters and lamp ends.

[0059] The lamp arrangement need not be a parallel series of tubular lamps. The lamps may be generally tubular but "bent" into, for example, generally "S" or "W" type planar shapes in a similar way to Neon sign writing. It will be understood that a single "S" shaped planar lamp may replace the space occupied by three straight tubular lamps but will require a third of the associated electronic componentry. A planar generally "S" shaped lamp will therefore produce less heat and will start and finish at different tube end circuit boards **10,11**. In contrast, a planar generally "W" shaped lamp will replace the space occupied by four straight tubular lamps but require a quarter of the electronic componentry. Generally however, the arrangement of tubes will be substantially planar (in a display plane) to minimise the thickness of the display apparatus.

[0060] With reference now to **FIGS. 1***a* and **2***a,* in accordance with a preferred embodiment of the present invention, a circuit board substrate or POB **14** is provided for mounting each of the electrical components forming the power supply for the lamps **5**. It can be seen that the PCB **14** is preferably mounted over the lamps, substantially parallel to the plan of